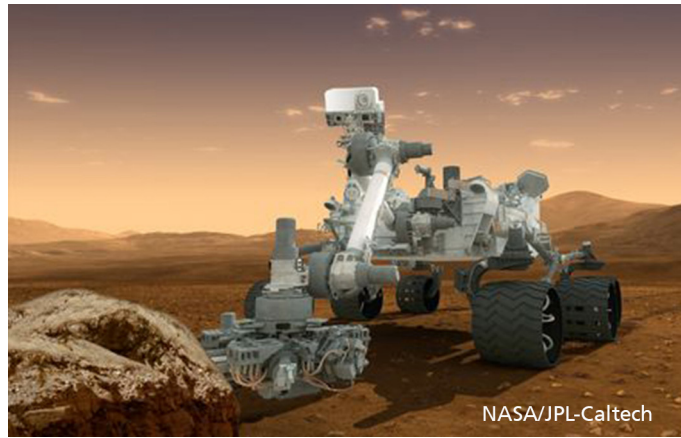


## Oxford Instruments X-Ray Technology Lands on Mars

Oxford Instruments X-Ray Technology has taken center stage in the most sophisticated scientific exploration ever attempted on Mars. NASA's Mars Science Laboratory mission, carrying the one-ton "Curiosity" rover, successfully touched down in August and quickly began assessing the planet's past and current habitability. At the heart of this undertaking is a specially designed Oxford Instruments X-ray tube located in the Curiosity's Chemistry and Mineralogy instrument (ChemMin). Using X-ray diffraction, the ChemMin analyzes rocks and soil to provide clues about the planet's climate and geology.

Mineral composition indicates environmental conditions that existed during formation, in particular, what role water, an essential ingredient for life, played in the mineral's development. The Curiosity prepares samples for analysis by drilling into rocks, collecting the resulting fine powder, sieving it, and then delivering it to a sample holder. ChemMin then directs an X-ray beam as fine as a human hair through the powdered material, reading the minerals' internal structure by recording how their crystals distinctively interact with X-rays.



Scientists believe Mars' past environment was quite different, with more water and a thicker atmosphere—its current atmosphere is 100 times thinner than Earth's. Studying what happened to the Martian atmosphere will help researchers establish whether the planet once had or could support life. In addition to identifying new minerals, Curiosity's experiments have found soil with composition similar to what is produced by Hawaiian volcanoes. Having a complex chemical laboratory on the surface of Mars is a crucial component in this investigation, according to Paul Mahaffy of NASA's Goddard Space Flight Center in Greenbelt, Md.

Geologists commonly study mineral structure on Earth using X-ray diffraction equipment in large, stationary laboratory instruments. Curiosity's onboard laboratory, however, required a tool small enough to fit on the rover, rugged enough to withstand space travel and advanced enough to provide an extremely fine X-ray beam. To accomplish this NASA turned to Oxford Instruments X-Ray Technology engineers who integrated their E4 and Apogee technologies into the ChemMin's X-ray tube. Mission scientists say this unit is producing more accurate mineral identifications than any method previously used on Mars.

Knowledge gained from this groundbreaking mission to Mars also has terrestrial applications, including oil and gas exploration, analysis of archaeological objects and screening of counterfeit pharmaceuticals.

Source: <http://www.nasa.gov/msl>